CLAIMS

1. A solder ball comprising

a spherical core, and

a solder layer, which includes Sn and Ag and which is provided so as to wrap the core up,

wherein the amount of water contained in the solder layer is 100 μl/g or less when represented by the amount of water vapor in standard conditions.

2. The solder ball of claim 1, wherein the solder layer includes an Sn-Ag alloy.

3. The solder ball of claim 1, wherein the solder layer includes a first metal layer, which is provided so as to wrap the core up, and a second metal layer, which is provided so as to wrap the first metal layer up, and

wherein one of the first and second metal layers includes Sn and the other metal layer includes Ag.

4. The solder ball of one of claims 1 to 3, wherein the

core is made of Cu, Al or a resin.

5. The solder ball of one of claims 1 to 4, wherein the solder layer includes 0.5 mass% to 4.0 mass% of Ag.

6. The solder ball of one of claims 1 to 5, wherein the solder layer includes Cu, Sn and Ag.

7. The solder ball of claim 6, wherein the solder layer includes 3.5 mass% of Ag.

8. A method of making a solder ball, the method comprising the steps of:

preparing a spherical core;

forming a plating layer, including Sn and Ag, by an electroplating technique such that the plating layer wraps the core up;

heating the core with the plating layer, thereby keeping the plating layer molten for a predetermined period of time; and

solidifying the molten plating layer, thereby making a solder layer.

9. The method of claim 8, wherein the step of forming the plating layer includes the step of forming an alloy plating layer including Sn and Ag.

10. The method of claim 9, wherein the step of forming the plating layer includes the step of forming an additional plating layer including Ag.

11. The method of claim 8, wherein the step of forming the plating layer includes the steps of:

forming a first plating layer, including Sn, such that the first plating layer wraps the core up, and

forming a second plating layer, including Ag, such that the second plating layer also wraps the core up.

12. The method of one of claims 8 to 11, wherein the solder layer includes Cu, Sn and Ag.

13. The method of claim 12, wherein the solder layer includes 0.5 mass% to 4.0 mass% of Ag.

14. The method of claim 12, wherein the solder layer includes 3.5 mass% of Ag.

15. A solder ball made by the method of one of claims 8 to 14.

16. A method of making a solder ball, the method comprising the steps of

preparing a spherical core, and

forming a solder layer, including Sn and Ag, such that the solder layer wraps the core up,

wherein the step of forming the solder layer includes the step of forming a first solder layer, including an Sn-Ag alloy, by an electroplating process that uses a plating solution including 10 g/l to 25 g/l of tris(3-hydroxypropyl) phosphine, 15 g/l to 25 g/l of Sn organosulfonate, 0.3 g/l to 1.5 g/l of Ag organosulfonate, 50 g/l to 100 g/l of

organic sulfonic acid, and ammonia, and

wherein the first solder layer includes 0.5 mass% to 2.5 mass% of Ag.

17. The method of claim 16, wherein the plating solution further includes 3 g/l to 12 g/l of thiourea.

18. The method of claim 16 or 17, wherein the step of forming the solder layer further includes the step of forming a second solder layer including Ag.

19. The method of claim 18, wherein the second solder layer is formed by an electroplating process, an evaporation process or a colloidal process.

20. The method of claim 19, wherein the second solder layer is formed by the electroplating process and has a thickness of at most 0.5 μm.

21. The method of one of claims 18 to 20, wherein the

solder layer includes 3.0 mass% to 4.0 mass% of Ag.

22. The method of one of claims 16 to 21, wherein the first solder layer has a thickness of 3 μm to 50 μm.

23. The method of one of claims 16 to 22, wherein the core is made of Cu, Al or a resin.

24. The method of one of claims 16 to 23, wherein the solder layer includes 3.5 mass% of Ag.

25. The method of one of claims 16 to 24, wherein the core has a diameter of 0.05 mm to 1 mm.

26. A solder ball made by the method of one of claims 16 to 25.

27. A method of making a semiconductor interconnect structure, the method comprising the steps of:

preparing solder balls by the method of one of claims 8

to 14 and 16 to 25;

preparing a board on which pads of a conductive material are arranged;

putting and heating the solder balls on the pads, thereby turning the solder layer into a molten solder layer; and

solidifying the molten solder layer.

28. A solder ball comprising

a spherical core, and

a solder layer, which includes Sn and Ag and which is provided so as to wrap the core up,

wherein the solder layer includes a first solder layer made of an Sn-Ag alloy, and

wherein the first solder layer includes 0.5 mass% to 2.5 mass% of Ag, and

wherein the amount of water contained in the solder layer is 100 μl/g or less when represented by the amount of water vapor in standard conditions.

29. The solder ball of claim 28, wherein the solder layer further includes a second solder layer, which is provided so as to wrap up the first solder layer, and

wherein the second solder layer includes Ag and has a thickness of at most 0.5 μm.

30. The solder ball of claim 29, wherein the solder layer includes 3.0 mass% to 4.0 mass% of Ag.

31. The solder ball of one of claims 28 to 30, wherein the first solder layer has a thickness of 3 μm to 50 μm.

32. The solder ball of one of claims 28 to 31, wherein the core is made of Cu, Al or a resin.

33. The solder ball of one of claims 30 to 32, wherein the solder layer includes 3.5 mass% of Ag.

34. The solder ball of one of claims 28 to 33, wherein the core has a diameter of 0.05 mm to 1 mm.

35. A semiconductor device including the solder ball of one of claims 1 to 7, 15, 26 and 28 to 34.